

Monitoring Community Health Status for Emergency Preparedness

From Identifying Needs to Implementing a Syndromic Surveillance System

Targeted for Epidemiologists, Disease Control and Emergency Preparedness Directors and Information Technology Professionals



What are the benefits of an Early Event Surveillance System? Consider:

- Ability to detect important changes in community health status very early
- Ability to rule out the existence of a public health emergency
- Ability to identify potential cases during a recognized outbreak
- Opportunities to utilize sources of data regarding health care seeking behaviors previously unavailable to public health officials
- Automation of data collection and analyses
- Increased awareness of institution-specific patient loads and distribution of specific presentations

—in short, a broader, more timely grasp of current health status in a community.

1. Understand the need for timely health data.

Surveillance systems can provide very much information to assist with routine and emergency functions of public health officials. Consider:

- whether current surveillance systems allow ascertainment of near-real time health needs of the community?
 - whether current surveillance systems allow for an understanding of the nature and disposition of emergent care encounters among community residents?
 - whether current surveillance systems allow for monitoring and case finding within recognized events without placing undue burden on hospital and health department staff?
 - whether current surveillance systems allow health officials to rule out the existence of an emergency with confidence?
 - whether current surveillance systems support 24/7/365 initiation of disease reports for designated conditions as well as outbreaks and emergencies?
- 2. To enhance existing surveillance systems, carefully identify and engage partners:**
- internal partners – *information technology, disease control, public information and health officers* will all bring critical expertise to planning, implementation

and day-to-day operations, and

- external – *other governmental entities* (e.g., *emergency planners, traditional first responders*), *hospitals, school officials, primary care providers* should be included in conceptualization of system design to enhance the utility for the mutually held interests of emergency response.

3. Begin to design the required system elements by making decisions about data:

- What data sources are readily available in a format that could be utilized for surveillance purposes?
 - Data sources should already exist in appropriate electronic formats.
 - All candidate data sources should reflect early indicators of disease onset.
 - Primary data source should convey clinical or near-clinical information about the nature of the illness, such as chief complaint or encounter codes. Primary data source should be very timely (e.g., less than 24 hours between encounter and report).
 - Primary data records should provide unique linkage to additional information, such as medical records for expansion of investigative efforts when required.
 - Secondary or corroborating data sources need not provide individual level data.

Determine coding strategy:

- Syndrome definitions can be implemented to broadly categorize health encounters into generalized systemic complaints or specifically to capture complaints that could be related to intentional releases of biologic, chemical or radiological agents. When multiple data streams are deployed in a single system, it is critical to consider the ability to create analogous categories in all data sources.
- Chief complaint data require text parsing algorithms; diagnostic or encounter codes can be grouped using standard query arguments.

Choose data transmission protocols:

- Completely automated processes are most reliable.

Determining the value of syndromic surveillance: the impact of implementation decisions

Syndromic surveillance operates successfully based on the rapid and automated evaluation of generalized events, e.g., the detection of aberrations in the occurrence of broadly categorized health encounters. Upon detection of such aberrations, the system's value is determined by its capacity to:

- Present a summary of the aberration in meaningful epidemiologic terms
- Visualize data in user-directed arrangements
- Support user-generated queries at the aggregate and individual complaint level across all data variables and sources
- Present comparisons of multiple statistical evaluations
- Visualize spatial distribution of detected aberrations
- Make side-by-side or integrated comparisons of multiple data sources
- Export data in formats useful for further data presentation and analyses
- Provide tools that assist in generation and testing of hypotheses

- Transmissions must be secure to protect individuals and institutions.

4. Select tools – syndromic surveillance tools typically consist of the following series of tasks: data ingestion, data preparation, coding, aberration detection, data presentation. Many products are available to accomplish these tasks, either piece by piece or in larger, comprehensive packages. Alternatively, some health officials opt to develop their own “home grown” systems.

5. Protect the integrity of the data system and the confidential information therein by establishment of Data Sharing Agreements (DSAs) and safeguarding all legal concerns. Public health

officials are empowered to collect, for surveillance and disease control purposes, data regarding the health of the communities they serve so long as the protection of those data are assured as set forth in the Health Insurance Portability and Accountability Act (HIPAA). DSAs between data providers and health officials should be employed to set forth the specific circumstances under which data can be shared with others and the safeguards to be put in place to make sure that all legal obligations are met.

6. Ascertain all locality concerns. Syndromic surveillance systems are ideally deployed in local health departments where a strong understanding of community norms facilitates comprehension of normal disease patterns. In instances where a State health authority may have deployed enhanced surveillance it is important to avoid redundancy of efforts and to facilitate compatibility as much as possible.

7. Understand how surveillance data will be utilized by development of review and response protocols. Enhancing surveillance systems by reduction of time between the health event and its report to health officials requires more timely review of the data. Moreover, these enhancements result in providing public health epidemiologists with volumes of new data. It is critical to minimize the impact of these enhancements by development of straightforward procedures for review and investigation of these data sources. Develop and retain highly skilled data analysts to support use and interpretation of the data.

8. Prepare to share findings by development of reporting formats and dissemination protocols based on the circumstances surrounding the report. In routine circumstances, findings from the surveillance system that are essentially normal may be distributed to a set of recipients that are engaged in routine disease control activities. However, when findings suggest unusual activity or during times of heightened vigilance (for example, increased National Security Level, etc) the distribution list may be expanded to make sure that all entities that could be involved in response efforts are kept informed.

FURTHER RESOURCES

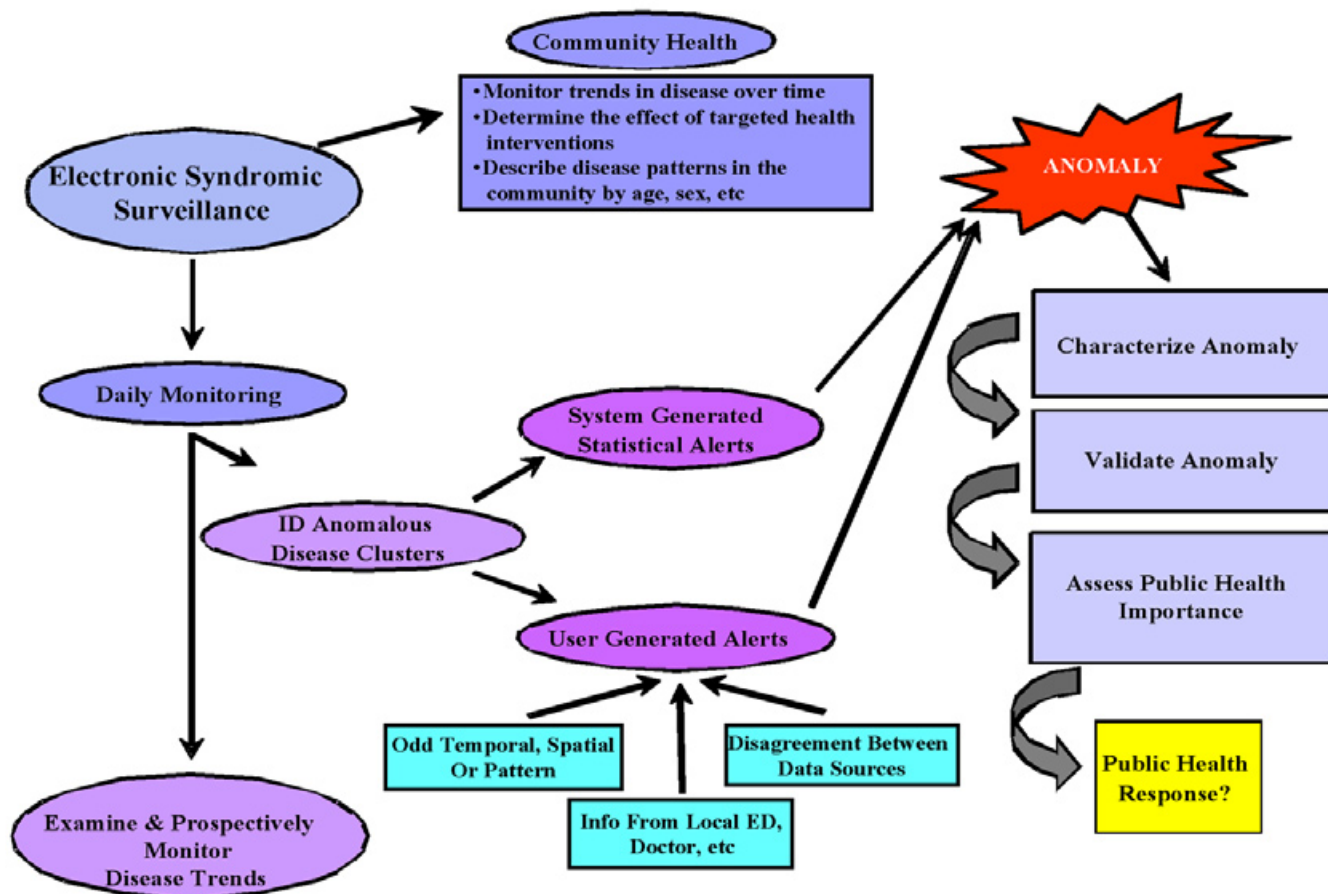
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Theoretical Framework for the Use of Electronic Syndromic Surveillance



This framework was produced in collaboration with Jacqueline Coberly, PHD, Johns Hopkins University, Applied Physics Laboratory.